Project C: Robit and the magical donut!

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Goals:

With this project, I wanted to learn how to implement lighting and shading in the WebGL environment. This time I focused less on developing an interactive user experience and more on the technical aspect, making the models as convincing as I could.

Instructions:

-Press w/a/s/d to move around the scene and r/f/q/e to pan the camera.

-Press G to toggle your headlight

-Use the provided buttons to adjust the Lighting (Phong/Blinn-Phong) and Shading (Gouraud/Phong) Methods.

-Use the table to adjust the second light source

-Press M to change the material of the mysterious donut!

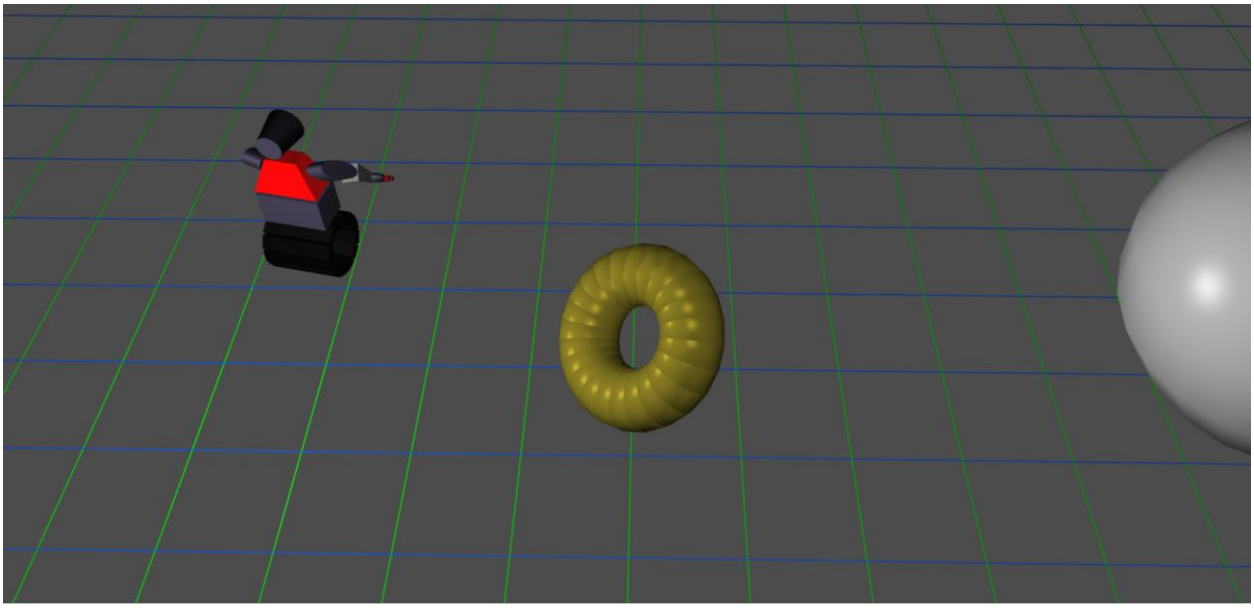
-Click and drag to rotate the donut

-Use the buttons to animate Robit

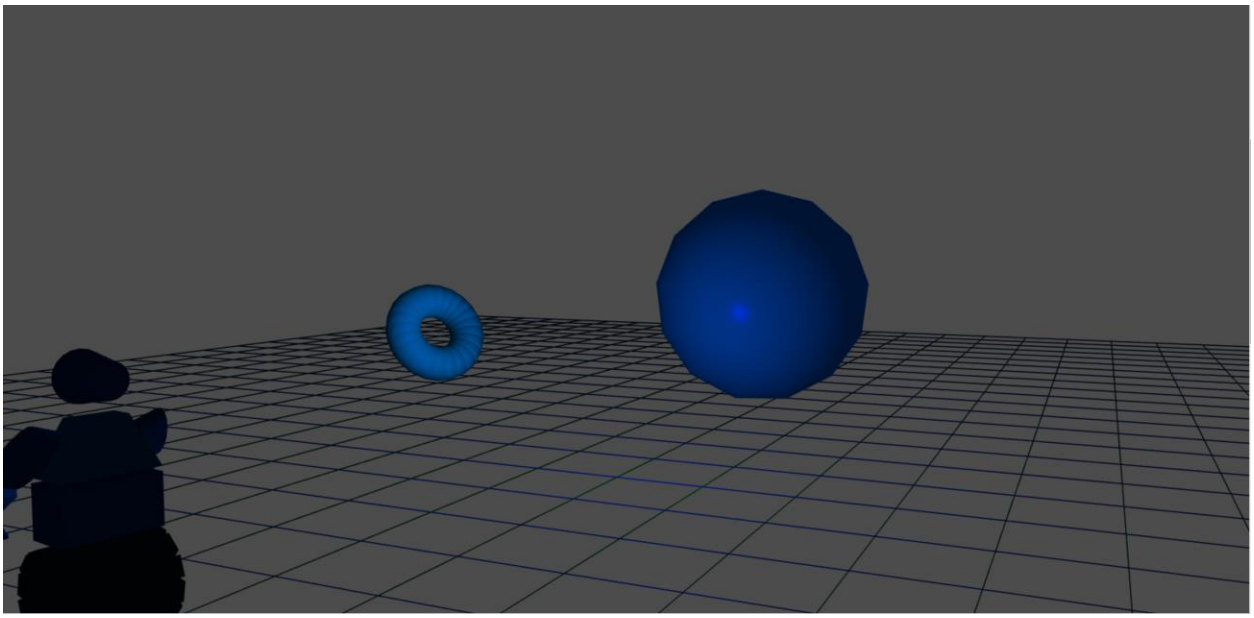
-Press (space) to pause all the animations.

-Press t to see only the transforms

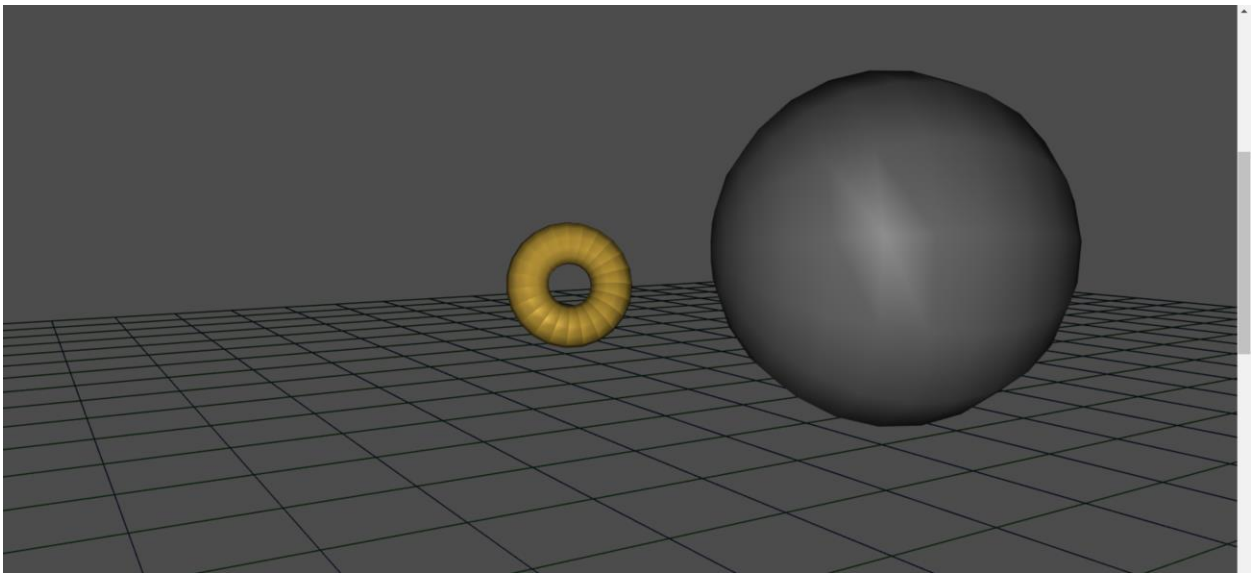
Results:



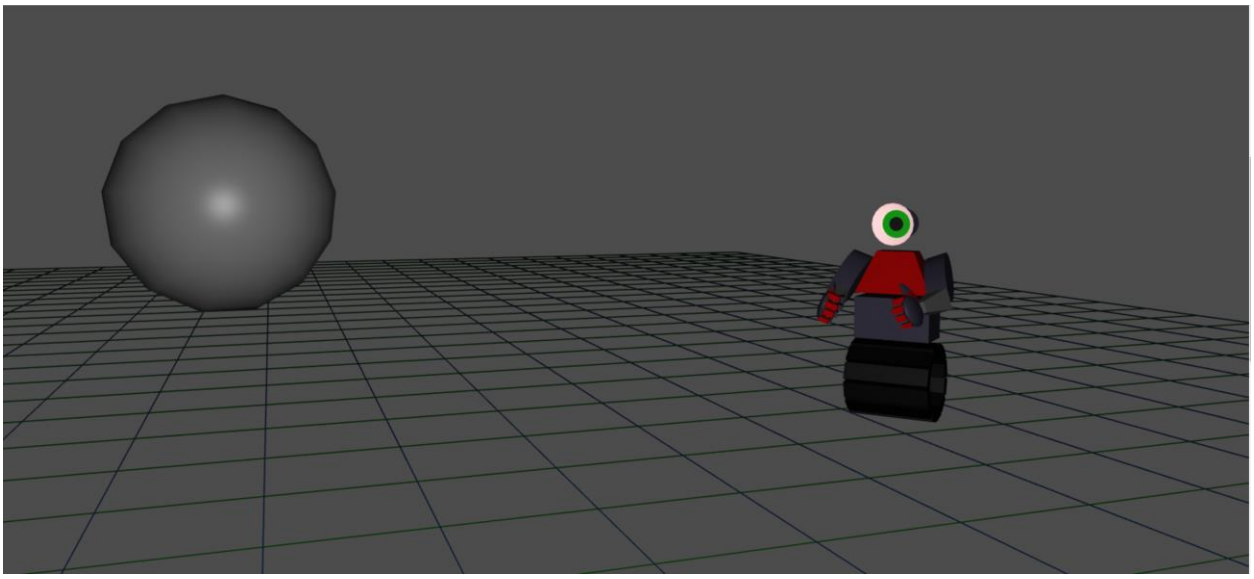
The donut’s normal are set to give it a bumpy texture which you can further appreciate by rotating it with mouse drags and changing it’s material by pressing M.



The secondary light of the scene can be placed anywhere and diffuse any color. This can dramatically shift the mood of the scene.



Different shading combinations will result in different effects (here Phong + Gouraud).



Finally, the addition of texture make Robit come alive!

SceneGraph:

CameraTransformation (in the MvpMatrix):

- Grid.
- Axes.
- Sphere.
- DonutRotation:
  - Donut.
- Rotation Around A Fixed Point:
  - Robot:
    - Head:
    - Body:
    - Wheels:
    - Arms:
      - Shoulder Joint:
        - Upper Arm:
          - Elbow Joint:
            - Forearm:
              - WristJoint:
                - Palm:
                  - Finger1
                  - Finger2
                  - Finger3
                  - Finger4
                  - Finger5

Every finger follows the following graph:

FingerJoint:

- Lower Finger:
  - MiddleJoint:
    - UpperFinger.